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Soil and Water Conservation News

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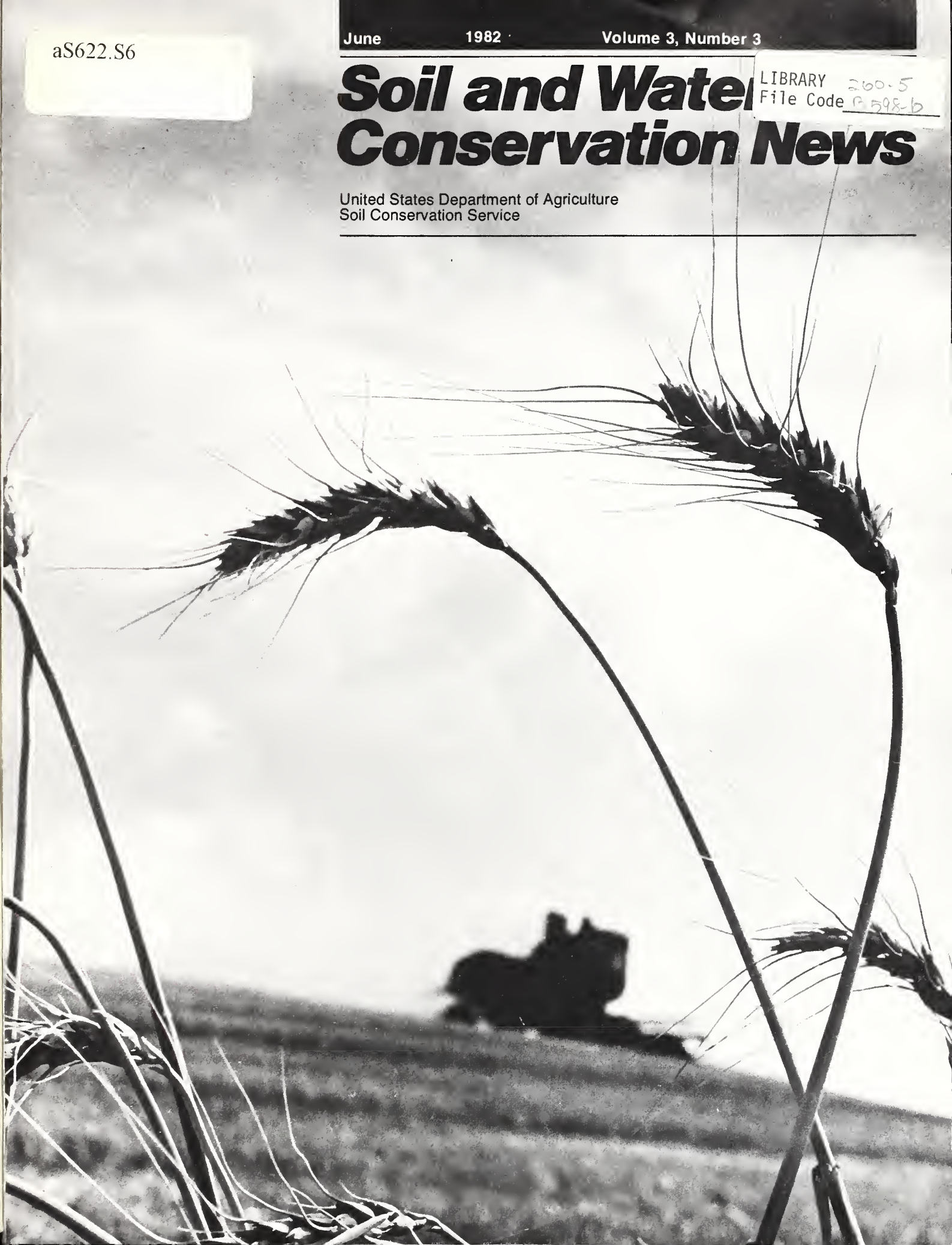

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Comments:

From the SCS Chief

Much has been said and written about the advantages of a voluntary soil conservation program over a mandatory one. Not as much has been said, however, about one ingredient that makes a voluntary program succeed, and that is persuasion.

Hugh Hammond Bennett, the father of soil conservation, was first and foremost a persuader. He not only identified soil erosion as a national threat and developed scientific ways to reduce it, but he also preached the virtues of his programs, hour by hour, day by day. Hugh Bennett understood that soil conservation has to take root in the hearts and minds of people before it can be applied to the land.

Like conservationists in every State, I have seen how carelessness or indifference can destroy land that was once productive. But I firmly believe that most farmers and ranchers and developers who fully understand the causes and cures of soil erosion will take action to prevent it. But we must do the selling. We must somehow rekindle the zeal and sense of purpose that Bennett brought to the program in its early years. Every SCS employee, every district official, needs to become a full-time persuader on behalf of soil and water conservation.

We cannot afford to wait for people to come to us, because the people we need to reach the most will not knock on our doors. We are going to have to knock on theirs. We need to talk to every group or individual that will listen to us. We need to find more graphic ways to get our story across. There are thousands of persuaders (and potential persuaders) already in the conservation movement, and we all need to redouble our efforts as salesmen for soil and water conservation.

Cover: Wheat harvest in the Palouse. The Palouse is one of four areas in the Nation with critical erosion problems where the Soil Conservation Service is targeting conservation technical assistance. (See articles on pages 4 and 5.)

John R. Block
Secretary of Agriculture

Peter C. Myers, Chief
Soil Conservation Service

All programs of the U.S. Department of Agriculture are available to everyone without regard to race, creed, color, sex, age, or national origin.

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RCA Update

The public comment period on the revised draft 1981 Program Report and Environmental Impact Statement prepared under the Soil and Water Resources Conservation Act of 1977 (RCA) has ended. Analysts in the U.S. Department of Agriculture have reviewed and summarized all comments. Secretary of Agriculture John R. Block and his top staff are examining their original proposals in light of the public's comments and other factors.

The Secretary and his staff have reviewed key policy issues and made preliminary decisions. They are preparing a statement of policy that will guide the Department's soil and water conservation programs in the future. This statement of policy must be cleared by both the White House and the Office of Management and Budget.

As this clearance process goes forward, the Secretary's staff is developing detailed plans for implementation of the RCA program, drafting the final RCA program report, and preparing an environmental impact statement in compliance with the National Environmental Policy Act of 1969 and in accordance with guidelines from the Council on Environmental Quality. Changes in the statement of policy could require changes in the other materials.

The schedule tentatively calls for distribution of the final program report in late July or in August. Delays in clearance of the statement of policy would likely move back all subsequent deadlines.

James N. Benson,
writer-editor, Planning and Evaluation, SCS, Washington, D.C.

Public Comments on Soil Conservation Programs Support More Targeting

A majority of nearly 83,000 people filing public comments on a proposed new soil and water conservation program for the U.S. Department of Agriculture would support targeting more USDA funds and personnel to areas where soil erosion and other conservation problems are critical.

Secretary of Agriculture John R. Block said 60 percent supported targeting, 32 percent were opposed, and 8 percent were neutral.

From last November through January, the public could comment on 20 separate features of the proposed program, which was mandated by the Soil and Water Resources Conservation Act of 1977 (RCA). Block asked for the public comments to help him prepare the final RCA report and recommendations to the President and Congress.

Targeting, now being tried on a limited basis, is a departure from traditional USDA conservation policies. It was one of 15 features that gained support from a majority.

Another proposal gaining majority support (53 percent for, 32 percent against, 15 percent neutral) was to require farmers to have conservation plans before receiving Farmers Home Administration loans.

Support on 13 other individual features of the program ran from 58 percent to 87 percent.

Three parts of the program received a fairly mixed reaction, without a majority either for or against them. Forty-six percent supported a proposal to set up new local coordinating boards, but 46 percent were opposed. A new National Conservation Board was opposed by 46 percent but supported by 36 percent.

Agreements between Governors of States and the USDA for conservation aid were supported by 32 percent and opposed by 48 percent.

Finally, two aspects of the program were widely opposed in the comments: State-level coordinating boards (60 percent opposition) and Federal matching block grants to States that would cause reductions in other Federal conservation program funds (64 percent opposition).

Block said many respondents added they were not opposed to grants to States in concept but did not want existing programs affected.

The USDA also asked for opinions on the three main program alternatives.

Alternative 1 was a recommendation of "continuation of current program trends." This gained 61 percent support and 21 percent opposition.

Alternative 2 was a "redirection" of the present Federal programs by priority setting and targeting funds, but without a greater role for local and State governments. This received 42 percent support and 38 percent opposition.

Finally, USDA's "preferred program," whose 20 individual features would both redirect Federal programs and add a greater local-State role, was given support by 43 percent, while 48 percent were opposed.

Among those responding to the invitation for comments were Governors and other State and local officials, farm organizations, and conservation groups.

Of the individual respondents, 62 percent were either farmers, ranchers, or rural landowners.

There was a heavy response from people involved with conservation activities, as nearly half the respondents identified themselves as either board members of conservation districts, members of county Agricultural Stabilization and Conservation committees, or employees of local, State, or Federal Government agencies.

Block said many who responded during the public comment period said they were satisfied with conservation services being provided by USDA but would like to see the assistance expanded.

Block expressed appreciation to respondents for taking the time to comment on the conservation proposals, saying, "We will carefully consider what the public told us as we make our final determinations on the USDA conservation program."

SCS Targets Assistance to 13 Water-Short and Critically Eroding Areas

In 1981, the Soil Conservation Service began targeting conservation technical assistance to four critical erosion areas and nine water-short areas in the United States.

SCS chose the areas based on severity and extent of the problem, effects on agricultural productivity and offsite damages, expected results, and local interest and willingness to support the effort.

The four areas with critical erosion problems are in the Palouse region of the Pacific Northwest, the Corn Belt, the Coastal Plains, and the Mississippi Valley Uplands. The areas with irrigation water management problems include three saline areas in Utah, Nevada, and Colorado; and six water-short areas in Idaho, Montana, Nevada, Oregon, Utah, and Wyoming.

Targeting is designed to accelerate conservation treatment in areas that have critical and persistent erosion and water problems.

SCS is working through local soil and water conservation districts with USDA's Agricultural Stabilization and Conservation Service and Extension Service and others on the targeting effort.

Some of the activities undertaken in the Palouse targeted area are described in the following article.

The Palouse, covering southeastern Washington and neighboring portions of Idaho and Oregon, is one of the most productive farmland areas in the world, but it also has one of the highest erosion rates in the United States. Water, wind, and improper tillage have stripped irreplaceable topsoil from cultivated areas for more than half a century. SCS, working through conservation districts, has accelerated technical assistance to the area to curtail the excessive erosion.

Palouse Soil-Saving Efforts Under Way

by Donald L. Comis

The Soil Conservation Service and conservation districts in the Palouse area of the Pacific Northwest are leading an intensive campaign to promote conservation tillage and other soil-saving practices. Their efforts are part of an SCS drive to target conservation technical assistance to areas of the country with the most severe soil erosion.

The Palouse covers more than 6 million acres, nearly all of which is under cultivation. Average annual cropland erosion rates of 20 to 30 tons per acre are common with rates of 100 to 200 tons per acre on the steeper slopes.

At the heart of the Palouse target area lie the Palouse Hills, made up of deep, silty loessal soils with slopes ranging from 15 to 45 percent. The Palouse Hills cover southeastern Washington, reaching into northern Idaho, and include some of the most productive dryland farming areas in the world, with top yields of wheat, barley, peas, and lentils.

The target area stretches from the very wet foothills of the Rocky Mountains in northern Idaho west to the very dry Columbia River Basin near the Cascade Range in Washington. It also extends south into Oregon, leaping the Columbia River gorge to include five counties on the Columbia plateau.

These Oregon counties, although physically separated from the Palouse Hills, are linked to them by similar soils, similar erosion problems, and equally productive dryland wheat farming areas.

The conservation districts in the Palouse target area are publicizing conservation tillage and other practices with demonstrations, tours, radio and television announcements, newspaper and magazine articles, newsletters, slide shows, brochures, and meetings.

Lynn Brown, SCS State conservationist for Washington, said, "Nearly every district supervisor plans to have one or more 'round-the-kitchen-table discussions with his neighbors to get commitments on being more effective conservation farmers." This is part of an overall effort in the target area to increase personal contact with farmers.

This past winter, SCS district conser-

vationists in Washington took portable computer terminals to many of these "kitchen-table" sessions to calculate crop budgets and the costs of various conservation practices using the AGNET system.

Washington was the first State to test cooperative agreements with districts as a way of using the target funds. Eighteen districts signed agreements to receive funds to promote conservation tillage and other practices. Several districts are using part of the money to lease many different types of no-till drills and other conservation tillage equipment.

Four districts in Washington's Whitman County pooled part of their money to hire an agronomist for five demonstration projects, each showing conservation tillage and conventional tillage on three different slopes.

Lincoln County, which is near the Columbia River, has a project showing chemical fallow with terraces, divided slopes, and stripcropping on a small watershed.

The South Douglas and Foster Creek districts, west of Lincoln County, are testing chemicals, donated by chemical companies, for conservation tillage. Farther south, in the Columbia River Basin, the Othello, Franklin, and Benton districts have severe wind erosion problems and are testing conservation tillage with windbreaks, mostly on irrigated land.

Private companies are stretching Palouse target dollars by donating chemicals and equipment for demonstrations and by providing financial and technical assistance.

Some of these companies brought equipment to and provided a speaker for the area's first conservation tillage conference, held in Moscow, Idaho, this past March. The Soil Conservation Society of America sponsored the conference in cooperation with Idaho and Washington conservation districts, the University of Idaho, Washington State University, the Cooperative Extension Service, SCS, and the Agricultural Research Service.

In Idaho, SCS provided funds to a few districts but chose to spend most of its funds on increased technical assistance for the seven districts in its target area.

The Benewah district supervisors in Idaho have been successful in their efforts to promote erosion control in recent years. They have blended funds from a new State cost-sharing water quality program with a State grant to apply conservation practices in the Hangman Creek watershed. And they are following the watershed into Washington, working with the Pine Creek district in Whitman County and the Spokane district.

The Palouse efforts have been a catalyst, in some districts, for spreading conservation tillage with Federal and State cost-sharing programs and grants, especially USDA's Agricultural Stabilization and Conservation Service's programs and U.S. Environmental Protection Agency grants.

Some of these programs are water quality programs intended to reduce sediment pollution from soil erosion in the Columbia and Snake Rivers.

Inspired by the Palouse efforts, the Lewis County, Idaho, district planted more than 500 acres this past fall with a no-till drill leased with a grant from the Idaho State Department of Energy. In February, the district worked with the county extension agent to schedule a luncheon meeting on conservation tillage which was attended by more than 100 of the district's 250 farmers.

SCS in Oregon decided to use its Palouse funds only to increase technical assistance to the five districts participating in the program.

As elsewhere, the Palouse efforts have brought these Oregon counties a variety of conservation tillage machines and given farmers a chance to experiment with them for a small rental fee, if any. One district borrowed money to buy a very expensive no-till drill. Other districts are using equipment donated by companies for demonstrations.

The Palouse efforts have brought districts, government agencies, and private industry together to solve the area's chronic erosion problems. District supervisors have adopted the Palouse targeted area effort as their own and are selling it to their neighbors. They chose to control erosion mainly with management and cultural practices, such as conservation tillage and annual cropping. They know that these soil-saving techniques will benefit hundreds of thousands of acres immediately and inexpensively, and that they can use them as a foundation for future conservation efforts.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

ACP Funds To Go to Targeted Areas

USDA's Agricultural Stabilization and Conservation Service (ASCS) will provide $9 million during fiscal year 1982 to targeted problem areas. Fifteen States will be eligible to receive the agricultural conservation program funds to help meet critical soil erosion and water conservation problems.

The funds are available in the same geographic areas where the Soil Conservation Service (SCS) is targeting conservation technical assistance.

"With both ASCS and SCS working together on these problems, we will be bringing all the conservation resources and expertise in the Department to bear where the need is greatest and we can get the most for our money," said Secretary of Agriculture John R. Block.

In granting funds for the program, ASCS will emphasize those measures that provide cost-effective solutions to resource problems.

Block said both water conservation and erosion control measures will emphasize long-term agreements covering a period of from 3 to 5 years.

West Virginia Leads the Nation in Use of Reclamation Funds

In November 1981, when the entrance to an abandoned coal mine in a public park was sealed, West Virginia became the first in the Nation to complete a reclamation project through a State reclamation program with money from the Abandoned Mine Reclamation Fund. The fund, provided for in the Surface Mining Control and Reclamation Act of 1977, consists of fees paid by coal mine operators for use in reclaiming and restoring land and water resources adversely affected by past coal mining. Coal mine operators pay 35 cents per ton on surface-mined coal and 15 cents per ton on coal from underground mines.

The Office of Surface Mining of the U.S. Department of the Interior must approve a State's regulatory program and reclamation plan before the State receives any of the reclamation funds for a State reclamation program. West Virginia's program and plan were approved in January 1981, and in August, the State received $2,455,000 for 11 reclamation projects in 8 counties. The projects include sealing mine openings, stabilizing slopes, re-directing drainage from underground mines, and filling deep mine cavities with fill material. These funds are separate from Rural Abandoned Mine Program (RAMP) funds, administered by USDA's Soil Conservation Service.

West Virginia has a long history of coal mining which has left a wake of environmental problems associated with abandoned mines in at least 39 of its 55 counties. According to the U.S. Department of the Interior, those problems include: 37,500 acres of unreclaimed surface-mined land; 89,100 acres of surface settling; 52,900 acres of nonburning refuse piles and 1,190 acres of burning refuse piles; 3,130 miles of streams adversely affected by past coal mining; and 8 mine fires.

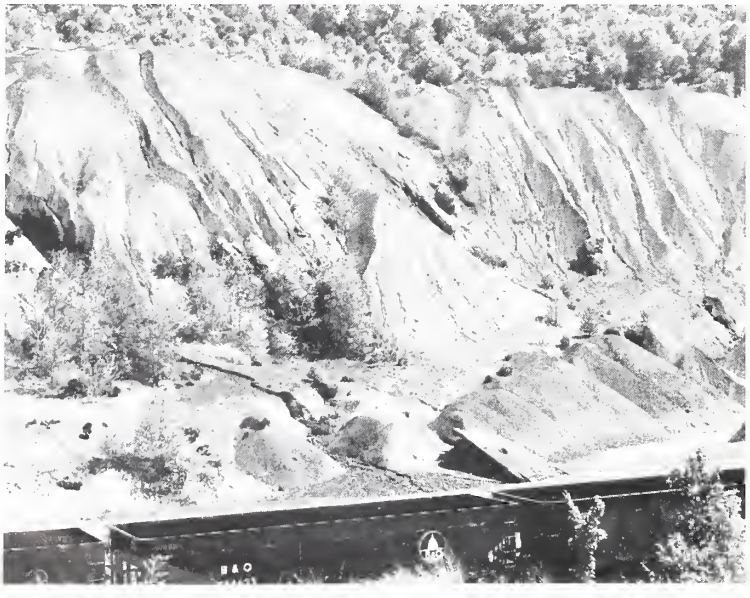
Unable to solve all of its problems on abandoned mined land, West Virginia has developed a priority system for first solving those problems threatening human life and property. Sites causing severe environmental damage are also high priority.

Once a coal mining State or Indian tribe receives approval of its regulatory program and reclamation plan under the Surface Mining Act, each is entitled to receive at least 50 percent of fees collected from coal operators within its borders. Since the fee collection system went into effect October 1, 1977, West Virginia coal operators have paid more than $73 million into the reclamation fund.

When the money is disbursed, at least 50 percent must eventually go to the State or Indian tribe for reclaiming abandoned coal-mined lands. The Office of Surface Mining may receive 20 percent to fund emergency projects where conditions pose imminent danger to health, safety, or the general welfare, to fund research in new methods for reclaiming abandoned coal-mined land, and to meet the expenses of managing the fund. Through RAMP, SCS may receive up to 20 percent to provide cost sharing to landowners or land users in applying conservation systems to control erosion and sedimentation on mined land. The Small Operators Assistance Program, administered by the Office of Surface Mining, may receive up to 10 percent to use in helping small coal operators comply with the requirements of the Surface Mining Act.

About eight other States have requested funds and are ready to move forward with approved reclamation programs.

George Wise, Jr.,
administrator, Abandoned Mine Lands Section, Division of Reclamation, West Virginia Department of Natural Resources, Charleston, W. Va.



Typical of the problems associated with abandoned mines in West Virginia is this coal refuse pile near Galloway. Severe erosion is carrying refuse material into a stream along the 70-acre pile. In addition, the coal embankment slopes are unstable, sliding into a stream at two points and onto a major highway at a third.

Alabama Completes First RAMP Project

In Walker County, Ala., an abandoned mine site with a 65-foot highwall, a dangerous reminder of past surface mining for coal, has been reclaimed and put into productive use.

This was Alabama's first completed project under the Rural Abandoned Mine Program (RAMP) of the Surface Mining Control and Reclamation Act of 1977. Under RAMP, the Soil Conservation Service, through soil and water conservation districts, helps rural land users develop and carry out plans to reclaim abandoned mined land.

The Walker County site was a community nuisance and a hazard to safety and health. Because of erosion, part of the highwall had started to slide, encroaching on an unpaved county road.

"The 20-foot-wide dirt road, with the highwall on either side, was so dangerous that the Walker County Board of Education discontinued the school bus route," said Grady Perry, chairman of the Walker County Commission. "It was a hazardous situation for the folks living back there. After the school bus stopped coming, the parents had to make two trips a day on that narrow road over the highwall to take their eight children to catch the bus or pick them up after school."

A large lake was left at the foot of the highwall. It contributed to a mosquito problem and provided a dangerous, stagnant swimming hole for local children, who used the highwall for a diving board.

Working through the Walker County Soil and Water Conservation District and with the Walker County Commission, SCS developed a reclamation plan for the 66 acres of privately owned land. The plan called for the highwall and other ridges left from the mining to be graded. The lake was drained—revealing, among other things, a stripped 1979 pickup truck—and a two-lane road was built on the contour of the land.

After the land was graded, it was seeded to weeping lovegrass, sericea lespedeza, and common bermudagrass to protect it until trees could be planted. Plantings of bahiagrass were made for additional wildlife food and cover. The steeper slopes were hydroseeded and will be maintained for wildlife.

Last February, nearly 35,000 loblolly pine trees were planted on 48 acres and are expected to grow fast on the reclaimed land. Wayne Herzig, one of the landowners, said he plans to follow recommended management practices for the trees so they will produce high yields of timber.

The project cost about $350,000. The Walker County Commission leased the land and signed a 5-year contract to maintain the improvements on the project. According to Gary Kobylski, SCS district conservationist in Jasper, little maintenance work will be needed.

"Excellent sediment basins have been built to protect the road ditches, and all roadbanks have been vegetated. The cover of grass and trees should prevent erosion," said Kobylski.

Morris S. Gillespie,
public information officer, SCS, Auburn, Ala.

Two SCS Programs Restore County Park

A county park in southwestern Pennsylvania, suffering from lakeshore erosion and abandoned mined land hazards, has been cured through two Soil Conservation Service programs.

Area residents and visitors to Mammoth Park in Westmoreland County enjoyed its 15-acre lake for fishing, canoeing, and beauty. But its beauty was marred by bare, eroding spots along the shoreline on the south side and an abandoned highwall left from past coal mining on the north side. Not only were these areas unsightly and a source of sediment in the lake, but the highwall also created a safety hazard. It had an unprotected, sheer vertical drop and an unstable rock overburden.

SCS, through the Westmoreland Conservation District, worked with the Westmoreland County Department of Parks and Recreation to solve the problems. The shoreline erosion was attacked through the Penn's Corner Resource Conservation and Development (RC&D) Area and the highwall eliminated under the Rural Abandoned Mine Program (RAMP).

An inventory and evaluation showed that a major cause of the soil erosion was inadequate control of surface and subsurface water. To solve this, a diversion and stone waterway outlet were built to control surface water, and several drop boxes along with an extensive system of subsurface drains were installed to control ground water. Employees of the county parks department did the rest of the work, which included grading and shaping, placing rock riprap, and seeding and mulching.

The RAMP plan called for grading the highwall and establishing permanent vegetative cover. A diversion and level spreader outlet were added to control runoff.

Another problem was found downstream from the lake: a 2-acre area covered by coal waste and bare of vegetation. A soil analysis revealed aluminum toxicity. The project sponsors determined that there was enough soil above the highwall to borrow and mix with the toxic material, which, along with large applications of lime, reduced the toxicity.

Under the RAMP and RC&D projects, clear water, grassy slopes, and scenic beauty have been returned to Mammoth Lake.

Wesley Gordon,
district conservationist, SCS, Greensburg, Pa.

News Briefs

SCS To Improve Erosion Prediction Models

This year the Soil Conservation Service formed a permanent National Sheet and Rill Erosion Committee to update the Universal Soil Loss Equation (USLE) and explore the use of more recent erosion prediction models.

The USLE is an equation developed in the 1950's to give field workers a way to estimate soil movement from sheet and rill erosion. A more recent model, CREAMS (Chemicals, Runoff, and Erosion from Agricultural Management Systems), estimates the amount of sediment and chemicals delivered to field edges.

The committee will identify research needed to verify the CREAMS model and make the USLE more useful throughout the United States and its Territories. For example, the USLE needs data on the erodibility of soils in Hawaii and Puerto Rico and snowmelt erosion in the Northwest.

The committee will also set guidelines for using these and other models.

Fairgoers Visit Conservation Exhibit

Thousands of visitors have passed through the soil conservation exhibit at the 1982 World's Fair at Knoxville, Tenn., and hundreds of thousands more are expected before the fair closes in October.

The exhibit is part of the Tennessee Valley Authority (TVA) display that was constructed on two giant barges that are moored on the river at the fair site.

Soil Conservation Service offices in Tennessee and Alabama contributed to the agricultural portion of the exhibit that tells about the soil conservation efforts in the valley.

In the exhibit is a display on conservation tillage that includes an actual no-till planter. TVA and SCS have a campaign on throughout the Tennessee Valley to promote conservation tillage.

Illinois Sets Erosion and Sediment Control Standards

By the end of April this year, all 98 Illinois soil and water conservation districts had adopted soil erosion and sediment control standards based on a State program. The program calls for eliminating excessive erosion by applying conservation systems and practices on all land. It includes a four-step plan to reduce erosion on cropland to the tolerance level, "T" value, as established by the Soil Conservation Service and published in the U.S. Department of Agriculture's SCS Technical Guide, by January 1, 2000. "T" value means the average annual tons per acre soil loss a given soil may experience and still maintain its productivity over an extended period of time. Both physical and economic factors are considered.

The first step calls for farmers to reduce erosion to 4 to 20 tons per acre by January 1, 1983. The next step requires farmers to reduce erosion, by 1988, on slopes of 5 percent or less to the "T" value—1 to 5 tons per acre per year. On land with slopes greater than 5 percent, the limit is two times "T"—2 to 10 tons per acre per year. In both cases, the requirement holds only if farmers can achieve it with low-cost practices such as conservation tillage.

By 1994, erosion cannot exceed 1.5 to 7.5 tons per acre per year on any cropland, and by 2000 it must be at or below the "T" value.

These steps are voluntary goals written into State law with provisions for soil and water conservation district and State hearings for complaints about violations.

FCIC Changes Hands in USDA

Secretary of Agriculture John R. Block recently transferred oversight and supervision of the U.S. Department of Agriculture's Federal Crop Insurance Corporation (FCIC) from one under secretary of agriculture to another.

The agency, previously supervised by Seeley Lodwick, under secretary for international affairs and commodity programs, will be transferred to Frank Naylor, under secretary for small community and rural development.

"This move will provide improved balance by grouping together those agencies which offer essentially financial programs," Block said. "They include Farmers Home Administration, Rural Electrification Administration, and now the all-risk crop insurance program."

Block said the transfer will also allow agencies reporting to Lodwick to concentrate on production programs to meet growing demand and on developing new markets for farm commodities.

The Congress created the FCIC in 1938 to insure crops against unavoidable losses and to develop the most practical plan, terms, and conditions of insurance for agricultural commodities. Currently, the agency is working toward a goal of reinsurance which will offer farmers an all-crop, all-risk insurance through cooperative efforts with private insurance corporations, Block said.

Questions About No-Till?

The answer may be in a 32-page reference book entitled "100 Most Commonly Asked Questions and Answers About No-Till Farming." The book is published by *No-Till Farmer* and is a result of answering questions received on their No-Till Telephone Hotline Service over the last 11 months. A copy of the book can be obtained from *No-Till Farmer,* P.O. Box 624, Brookfield, Wis., 53005. Cost is $3.95 per copy plus 75 cents for postage and handling.

Iowa Gains New Way to Locate Cultural Resources

The discovery of cultural resources during the construction of watershed projects causes delays, added expense, and possible damage to archeological sites. Small watersheds in western Iowa and much of the Midwest abound with buried cultural resources such as sites of prehistoric Indian villages and work camps. But the dramatic landscape changes that have occurred in that area over the last 3,000 years make it difficult, and sometimes impossible, to predict where such resources might be found.

The Soil Conservation Service, in cooperation with the Agronomy Department of Iowa State University, has devised a method for reconstructing old landscapes and identifying potential cultural resource sites in western Iowa watersheds. Adrian Anderson, State Historical Preservation Officer in Iowa, says the method is one of the most important developments for archeology in Iowa in the last 20 to 30 years. He says it will reduce the need for cultural resource surveys in some areas, cutting the cost and time involved for agencies complying with the National Historic Preservation Act of 1966, and will lead to more success in locating significant archeological sites.

Dean Thompson, an SCS archeologist on the planning staff in Des Moines, and E. Arthur Bettis, III, a soil scientist-geomorphologist formerly with Iowa State University and now with the Iowa Geological Survey in Ames, developed the system. They say it can be applied throughout the Midwest. Their work was part of cultural resource surveys being made for watershed planning in western Iowa.

In developing the system, Thompson and Bettis studied landscape changes caused by several episodes of erosion followed by sedimentation as far back as 11,000 years ago. By mapping the location and type of archeological sites discovered in the past and the age of the alluvium they occurred in, Thompson and Bettis have shown that the age of the alluvium can be correlated to the age of the cultural resources most likely to be found there. The most represented and well-preserved sites in watershed projects date from 3,500 years ago to the present.

This work has the potential for assisting soil engineers by providing information on the geotechnical properties of stratified alluvium. The information is used to improve technology for identifying appropriate construction sites.

In April, SCS and the Association of Iowa Archeologists sponsored a tour of the study sites in western Iowa watersheds for 40 archeologists, soil scientists, geologists, and botanists for various agencies and universities.

Nancy M. Garlitz,
associate editor, Soil and Water Conservation News, SCS, Washington, D.C.

SCS Releases Tasty Conservation Plant

The Soil Conservation Service plant materials center (PMC) in Aberdeen, Idaho, in cooperation with the Idaho Agricultural Experiment Station, recently released 'Delar' small burnet, a hardy perennial semi-evergreen forb. 'Delar' can be used in seeding mixtures for controlling erosion, revegetating minespoils and other disturbed areas, providing wildlife food and cover, and seeding rangeland in Idaho, Nevada, and Utah.

'Delar' is well adapted to many sites in the Intermountain Region, including areas of well-drained soils with average annual precipitation of 12 inches or more. It will grow on soils with a pH up to 8.0 and has survived winter temperatures as low as −33°F with minimal snow cover. Small burnet plants have been known to flourish as long as 20 years on Utah rangelands.

New leaves of the small burnet plant can be added to salads, iced drinks, vinegar, butter, and cream cheese. To many people the leaves taste somewhat like cucumber, and the plant has been widely cultivated in Europe as a salad herb. 'Delar' also makes an attractive ground cover and a good container ornamental if the flower stems are kept cut back.

Breeders' and foundation seed are being produced at the Aberdeen PMC. Foundation seed is currently available from the University of Idaho Research and Extension Center at Aberdeen and through soil conservation districts in Idaho, Nevada, and Utah. For additional information, contact Charles G. Howard, Jr., Manager, Aberdeen Plant Materials Center, Soil Conservation Service, P.O. Box AA, Aberdeen, Idaho 83210.

Is There a Nitrogen-Fixing Corn Variety in Your Future?

A Harvard University biology professor is trying to transfer genes from nitrogen-fixing bacteria to petunias so the petunias can make their own nitrogen.

Professor Frederick Ausubel said petunias are easy plants to work with and may teach researchers a way to do the same thing with major farm crops such as corn and wheat.

Ausubel said that genetic engineering saves time because scientists can observe millions of cells on one plant instead of observing millions of plants. They can then select cells with desirable characteristics and create new genetic combinations that could never form naturally.

Ausubel said the idea is to put chemical technology into the seed rather than applying it after the seed sprouts. This could lead to high-yielding crops that make their own fertilizers and pesticides and are resistant to drought, saline conditions, and herbicides.

Many farmers, such as wheat growers in the Great Plains, might try conservation tillage with currently available herbicides if they had a crop variety that would not be killed by residual herbicides.

Donald L. Comis,
assistant editor, Soil and Water Conservation News, SCS, Washington, D.C.

CONSERVATION Research Roundup

Erosion Control of Frozen Soil

Frozen soils may be a major cause of serious erosion losses that occur each year in the dryland grain region of the Pacific Northwest. Up to 15 tons of soil per acre were lost from frozen fields despite a complete absence of rainfall in a study conducted by USDA's Agricultural Research Service Hydrologist John F. Zuzel, Pendleton, Oreg.

The Pacific Northwest dryland grain region, about 8.5 million acres of cropland in eastern Oregon and Washington and western Idaho, possesses some of the most fertile and productive topsoil in the world. Unfortunately, erosion causes soil losses ranging from 2 to 25 tons per acre with some individual fields losing as much as 100 tons of soil per acre.

Previous investigations of the factors responsible for soil erosion in the area focused on runoff from rainfall and paid little attention to the effects of freezing. Zuzel, who began his study in 1979, has identified a chain of events that leads to runoff from frozen soils.

Zuzel says that the upper soil layers become saturated with water during the fall rains, then freeze to depths of 15 inches in the winter. A snow pack usually accumulates on the frozen soil, adding to the water available for runoff.

Warm, moist air masses from the Pacific condense water from the air onto the snow pack's surface which not only adds still more water to the snow pack, but also adds heat. The condensation process involves a change in state of the atmospheric water molecules from the vapor to the liquid phase. This change of state liberates large quantities of heat that thaw the snow pack.

Since the water infiltration rate of frozen soil is near zero, nearly all the water from the melting snow runs off, carrying with it detached particles of soil. As the rate of the melting snow increases, the velocity of downhill runoff increases and more soil particles are detached. Any rainfall released by the warm air adds further to the problem.

The amount of influence that management practices can have on runoff from frozen soils is yet to be determined. Zuzel observed in preliminary tests that leaving residue on the soil's surface in a reduced tillage operation prevented frost penetration to any great depth and the result was little or no runoff.

Zuzel says that more monitoring and observing are needed before any recommendations can be made. He would like one day to see a frozen soil runoff factor incorporated into the Universal Soil Loss Equation which is now being adapted for predicting annual soil losses in the Pacific Northwest.

Dr. John F. Zuzel is located at the Columbia Plateau Conservation Research Center, P.O. Box 370, Pendleton, Oreg. 97330.

Lynn Yarris,
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Reprinted from the September 1981 issue of *Agricultural Research*.

Soil Compaction May Sometimes Help

Compaction in selected areas along irrigation furrows can save water and energy by allowing irrigation water to be more evenly distributed in the field, according to a USDA Agricultural Research Service (ARS) study on the hydraulics of furrow irrigation systems.

Selective compaction allows infiltration rates along the length of a furrow to be controlled, and controlled infiltration rates make for a uniform distribution of water throughout the furrow. This is the key finding of the study which is being conducted at ARS's Snake River Conservation Research Center, Kimberly, Idaho.

The study, led by ARS Agricultural Engineer James A. Bondurant, has also shown that when infiltration is controlled, furrow lengths can be increased without increasing erosion. Longer furrows mean reduced irrigation equipment costs as well as less water and energy for irrigation.

Compaction, which reduces infiltration rates, is generally looked upon by farmers as a practice to be avoided. The fear is that crops will not receive enough water and yields will suffer.

Bondurant points out though that when a furrow is irrigated, it takes some time for water to travel the furrow's length. This time difference causes non-uniform water distribution, the upper end of the furrow often receiving too much water and the lower end receiving too little. By the use of controlled compaction to vary the infiltration rate continuously down the furrow, irrigation water can be applied uniformly.

The savings in water, energy, and equipment costs from controlled infiltration rates and longer furrows should put furrow irrigation within economic reach of more growers, an important point given the rising costs of sprinkler systems.

Growers concerned about low infiltration rates may not have to worry. The lowest infiltration rates observed at the Snake River Conservation Research Center in the experimentally compacted furrows were still more than enough to meet crop needs. In fact, Bondurant believes that uniform water distribution in furrows through soil compaction might increase crop yields as much as 20 percent.

"All farmers have seen that on soil where a tractor has crossed, infiltration rates are lowered and water passes over much more quickly than surrounding soil that has not been compacted," says Bondurant. "This is a rather gross application of the principle we are using. What is needed now are guidelines for infiltration rates of different soil types and precision compacting tools that compact the soil to the necessary degree."

Currently, Bondurant and his fellow researchers are working with a corrugating tool that rolls through soil for compaction, rather than shearing like a conventional corrugation shovel. Rolling requires much less energy than shearing.

"We're getting good compaction at the bottom of our furrows, but not enough uniformity along the sides," says Bondurant.

Working with Bondurant on this project are W. Doral Kemper, soil scientist and Snake River Conservation Research Center director, and B. J. Ruffing, technician. All are located at the Snake River Conservation Research Center, Route 1, Box 186, Kimberly, Idaho 83341.

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Buried Pipe System Controls Furrow Erosion

What is being called a "buried pipe runoff control system" promises to control furrow erosion and expand the productive areas of fields by 3 to 10 percent with rich sediment.

Conceived by USDA's Agricultural Research Service Soil Scientist David L. Carter at the Snake River Conservation Research Center, Kimberly, Idaho, the new system combines buried pipe drains with small sediment basins to eliminate tailwater furrow ditches. Eliminating tailwater ditches not only expands the usable area of a grower's field, it also cuts down on weeds and allows easier operation of farm equipment on the field.

A furrow is both a conveyance system and an infiltration system. As irrigation water flows down through a furrow, stream size decreases because of infiltration. To stretch the entire length of a furrow, an excess of water must be applied. It is estimated that 20 to 60 percent of the water applied to furrows becomes surface runoff.

To catch this excess water, growers commonly dig a ditch along the tail end of their furrows. A tailwater ditch is generally 6 or more inches deeper than the furrows and sloped steeply enough so that runoff flows rapidly from the field.

The problem is that as water falls from the furrow into the ditch, it carries with it soil from the furrow. Though undramatic at any given time, this erosion recurs with each irrigation, year after year. Gradually the lower end of the field becomes convex shaped with an ever-increasing slope. It's not unusual to find fields with furrows eroded as much as 65 feet from the tail ditch.

Carter's solution is to bury a pipe in place of the tailwater ditch and to cover it over until only a column of risers—spaced 20 to 60 feet apart, according to need—protrudes above the soil surface. Initially, dirt dikes are erected on the downslope side of the risers to back the water up to a depth that it runs down the risers into the pipe. This forms small sediment ponds. After a few irrigations, the ponds are filled with sediment to the top of the risers and the convex end of the field is leveled. Once a field is leveled off, excess irrigation water runs down into the risers without accumulating at the tail end of the field.

Burying the pipe allows equipment to pass over it. Risers may be struck by tractors with no damage because both risers and pipe are made of a flexible polyethylene material, thin but tough. This material is much more durable and less expensive to install than metal or concrete.

"At 17 sites in various tailwater ditches last year, we managed to capture between 5 and 12 tons of sediment per acre," says Carter.

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Reprinted from the November 1981 issue of *Agricultural Research.*

Furrow irrigation minus the tailwater ditch: Runoff from an irrigated field swirls through a riser into an underground pipeline.

Meetings

July

17–21	American Association of Nurserymen, Honolulu, Hawaii

August

7–11	National Farm and Power Equipment Dealers Association, Honolulu, Hawaii
8–11	Soil Conservation Society of America, New Orleans, La.
15–19	Association of State and Interstate Water Pollution Control Administrators, Salt Lake City, Utah
15–19	Conservation Education Association, Oakland, Calif.

September

12–14	World Fertilizer Conference, San Francisco, Calif.
12–16	National Association of County Agricultural Agents, Billings, Mont.
19–22	Society of American Foresters, Cincinnati, Ohio
19–24	International Association of Fish and Wildlife Agencies, Hilton Head Island, S.C.
22–24	National Waterways Conference, New Orleans, La.
22–25	American Fisheries Society, Hilton Head Island, S.C.
29–Oct. 2	American Horticultural Society, Cincinnati, Ohio

October

3–8	Water Pollution Control Federation, St. Louis, Mo.
6–8	Hardwood Plywood Manufacturers Association, Boston, Mass.
10–14	National Urban Forestry Conference, Cincinnati, Ohio
14–17	National Association of Biology Teachers, Detroit, Mich.
16–19	Farm and Industrial Equipment Institute, Boca Raton, Fla.
18–21	Geological Society of America, New Orleans, La.
20–23	Technical Conference on Irrigation, Drainage, and Flood Control, Jackson, Miss.
25–29	American Society of Civil Engineers, New Orleans, La.

November

8–14	The National Grange, Providence, R.I.
11–13	Future Farmers of America, Kansas City, Mo.
14–17	American Society of Farm Managers and Rural Appraisers, St. Louis, Mo.
14–17	National Forest Products Association, Boca Raton, Fla.
14–18	American Institute of Chemical Engineers, Los Angeles, Calif.
19–24	American Association of State Highway and Transportation Officials, Orlando, Fla.
20–23	American Society of Landscape Architects, Honolulu, Hawaii
28–Dec. 3	American Society of Agronomy, Crop Science Society of America, and the Soil Science Society of America, Anaheim, Calif.

December

7–9	National Farmers Organization, Louisville, Ky.

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